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THE WEEKLY SUMMARY OF CURRENT SCIENCE • SEPTEMBER 22, 1945

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See Page 183

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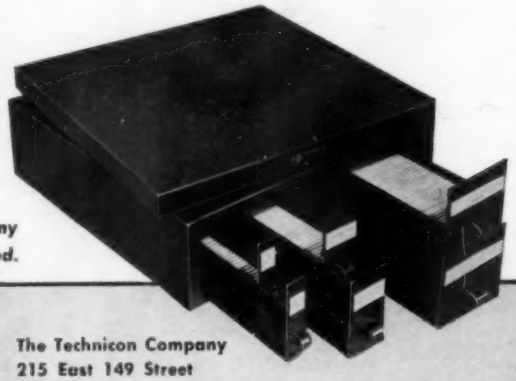

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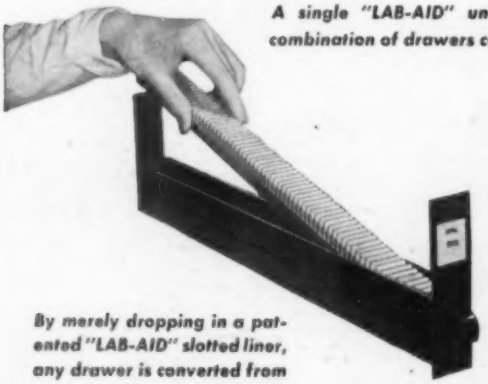

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NUTRITION

PW's Recover Quickly

Rapid recuperation from starvation of Americans liberated from Jap prison camps gives good prognosis for people in disturbed areas abroad.

➤ THE MEN, women and children in European and other disturbed areas who have suffered starvation or near starvation during the war will have a better chance for good recovery than has generally been expected, nutrition experts serving as consultants to the Army Medical Corps believe.

The speed with which Americans liberated from Japanese prison camps have recovered from starvation is the basis for this belief.

Civilians captured in the Philippines were examined during the 72 hours between their return to West Coast ports and their departure for their homes throughout the country. Results of the examinations were reported to Maj. Gen. Norman T. Kirk, Surgeon General of the Army, by the consultants, Dr. Allan M. Butler, of Massachusetts General Hospital, Dr. Julian M. Ruffin, of Duke University School of Medicine, and Miss Marion M. Sniffen and Miss Mary E. Nickson, of the American Red Cross in San Francisco.

Re-conquest of the Philippines came just in time for the American civilian prisoners of war, the report indicates. Those at Santo Tomas, Los Banos and Bilibid internment camps were then "slipping over into the borderline state of extreme starvation."

Late in 1944, the American administrative committee of the camp at Santo Tomas reported that "more than 50% of the camp had clinical signs of starvation."

On their return to America, shortly after their liberation, 78% of the internees reported that they felt "fine" except for getting tired easily.

The most common complaint still existing in the Americans, the nutrition consultants report, is neuritis of the hands and feet.

The biggest complaint they had immediately on reaching America was digestive upset suffered on their way back as they began to eat "something approaching a normal American diet."

These digestive upsets that came with the shift from the inadequate diet to highly concentrated food like the Army K ration give a tip to persons responsible in future for feeding liberated prisoners or starving populations. A special emergency diet should be used, the nutrition consultants advise. Skim milk and other suitable proteins, plus vitamins, should be given first, instead of carbohydrate foods like white flour and sugar.

Of the eight children born in captivity, only three showed the effects of malnutrition. Rickets was not as prevalent as it might have been from diet standards alone because the mild climate and sunlight in the Philippines made it possible for these babies to synthesize their own vitamin D.

The rapidity of recovery of the adults and the relatively good condition of the children show how quickly the human body will return to normal, the nutrition consultants stated.

"This recovery justifies a prognosis for individuals throughout disturbed areas of the world which is better than generally appreciated," they report.

"Continually, while the information submitted here was being obtained," the report concludes, "evidence of a chivalry of men to women and of men and women to the sick and young was revealed which should be recorded in honor of these individuals and as a tribute to the society whose code they adhered to under such trying circumstances."

Science News Letter, September 22, 1945

ENGINEERING

Telephone Installations Will Soon Begin

➤ TELEPHONE installations in private homes and in offices will follow closely the manufacture of new telephone instruments, switchboards for central offices and telephone exchange cable, it is announced by Western Electric Company, Inc., which manufactures most of the materials and equipment used by the Bell Telephone companies. Some of the manufacturing plants are already working on a seven-day week; others will, as soon as conversion from war manufacturing is completed.

The making of telephone instruments for civilian installations was actually reestablished in the late summer of 1944, after war needs were met. Over 400,000 instruments have been made since last fall and production is now going on at the rate of 25,000 a week. But even with this production, many subscriber applications cannot be filled immediately because of a shortage of switchboards and cable.

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BIG GUN! The undamaged tube of the gun found by Col. F. B. Porter in Bavaria was 105 feet long. (See page 180)

ORDNANCE

Biggest Gun Made

Found by American officer in Bavarian forest, the world's biggest gun fired shells weighing eight tons to an extreme range of nearly 30 miles.

➤ ONE SPECIMEN of the heaviest ordnance ever built, a monster weighing 1,344 tons that threw 31.5-inch shells weighing more than eight tons each to an extreme range of nearly 30 miles, has been found on an abandoned railroad track in Bavaria by an American field artillery officer, Col. F. B. Porter.

Reporting his discovery to the *Field Artillery Journal* (Sept.), Col. Porter states:

"Recently while on a mission which took me along a little-used road between the towns of Auerbach and Eshenbaum in Bavaria, I came to a small dirt road which led through the forest to a village called Metzendorf. There I met an American soldier who said that there were some big guns back in the woods. Being interested in weapons I followed the indicated route for about half a mile.

"On approaching a single-track railroad I saw a gun tube so huge that I stopped and gasped for breath. Upon further inspection I found the remnants of 14 railroad cars, intermingled along the track with special cars carrying two huge gun tubes, one cradle and carriage for these tubes, and the parts and accessories for one gun and carriage.

"Before abandoning them the Germans had performed as much demolition as was possible. One huge tube was intact, however, and the carriage, though badly damaged, can probably be repaired. The necessary parts of other weapons (if such still exist) could be used, making one weapon available for study."

The huge weapon was built by the Krupp works, and was originally intended for use against the Maginot line. Breakthrough at the "soft" end of that line at Sedan and the subsequent collapse of French resistance robbed it of that job. However, it was later used against the Russians at the siege of Sevastopol, where its enormous shells, rivalling in weight the biggest bombs carried later by Allied planes, were received with mingled dismay and incredulity. Guns of this type may also have taken part in the cross-Channel bombardment of Dover. It had been given a name: Gustav Geschuetz, which may be loosely translated as "Gus the Goon."

Although the gun was a giant, it was no freak, like the nine-inch weapon used in the ultra-long-range bombardment of Paris in the spring of 1918. Length of the tube, as paced off by Col. Porter, was 35 yards. Length of the rifled portion was only 36 times the diameter of its bore, which really makes it relatively short-barreled, as artillery pieces go.

Because of its enormous weight, and the necessity of moving it in several separate pieces, it required about three weeks after arrival at the firing point to set it up. Speed of the American sweep through southern Germany in the last days of the war, driving off the German cannoneers before they could complete demolition of the piece, may be thanked for saving at least one specimen for ordnance men to study.

Science News Letter, September 22, 1945

PLENTY OF ROOM!—The bore of this gun is 31½ inches in diameter!

SCIENCE NEWS LETTER
Vol. 48 **SEPTEMBER 22, 1945** *No. 12*

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St. N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents. Monthly Overseas Edition: By first class mail to members of the U. S. armed forces, $1.25 a year. To others outside continental U. S. and Canada by first class mail where letter postage is 3 cents, $1.25; where letter postage is 5 cents $1.50; by airmail, $1.00 plus 12 times the half-ounce airmail rates from U. S. to destination.

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Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAte 4439.

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PUBLIC HEALTH

Cuts Down Diseases

Disinfection of schoolroom air by ultraviolet light helps check infectious germs. This can be a substitute for air replacement.

➤ THE EVER-difficult problem of hygienic schoolroom ventilation may be solved by ultraviolet light, it appears from a report of Dr. Mildred Weeks Wells, of the University of Pennsylvania School of Medicine, in the *Journal of the American Medical Association,* (Sept. 15).

"School ventilation, which has necessarily been curtailed on account of fuel shortages during the war, will probably never return to prewar standards," she declares. "Enlightened opinion, which formerly opposed, on hygienic grounds, lowering the volume of air change, now recognizes the potentiality of higher standards of sanitary ventilation through air disinfection, which can practically provide the hygienic equivalent of ventilation impossible of attainment by actual air replacement".

The school ventilation standard of 30 cubic feet of air per minute per child is not only difficult to attain; it is not enough to prevent classroom spread of chickenpox and measles except in rooms where less than 40% of the pupils are susceptible to chickenpox and less than 20% are susceptible to measles.

In contrast to this, Dr. Wells found the chances of a susceptible child getting measles, chickenpox or mumps from a classmate can be definitely reduced by disinfecting schoolroom air with ultraviolet light.

Her conclusions are based on studies begun in the Germantown, Pa., Friends School in 1937 and subsequently expanded so that since the fall of 1941 they have included two neighboring private schools and two groups of public schools in Philadelphia suburbs.

Even better results may be attained with air disinfection as the result of the early experience with it. Proper servicing of the lamps is important. Teachers and pupils should understand how they work so as to avoid the mistake made in one school of draping the lights with autumn leaves and Spanish moss for the Thanksgiving festivities. This, of course, blocks the ultraviolet rays so they cannot get at the germs in the air to kill them.

In a first grade outbreak of measles, nine little girls being infected from a classmate, the cause was apparently the fact that a playhouse was put into the schoolroom. This reproduced in miniature the exact situation the lights were designed to prevent. It gave a chance for germ-laden droplets of moisture from one little girl's breath to reach all the others without having been exposed to the germ-killing light.

When the air has a high relative humidity, as it may in fall before the heat is on, the ultraviolet light is less effective in killing germs. This difficulty may be unavoidable.

Science News Letter, September 22, 1945

MILITARY SCIENCE

Radioman Tells Iwo Jima Experience

A letter to the Editor from James F. Ward RM 2/c, who took part in the Iwo Jima invasion.

➤ WE ALWAYS get our magazines and newspapers rather late out here, but in your March 31 issue we paid particular notice to the front cover. Our particular type of ship is not well known and little is said about them so we are always on the lookout for anything new concerning them that comes out in any of the magazines we get on the ship.

There were twelve LCS's that took part in the Iwo invasion and the cover of your magazine is without a doubt a reproduction of a photo of our group of LCS's coming away from Suribachi after a rocket run. The ship showing up best, lightest in color and directly in the center of the picture, we are sure is the "54," our ship.

For obvious reasons we would like some reproductions of the picture. If possible photos as large as the cover. What is sent will be left up to you of course.

Iwo was for most of us our first taste of action. We saw plenty of it there, too. Our gang made two rocket runs at the beach near the base of the famous mountain. One 90 minutes before the initial assault. We then led the actual landing in, covering the marines with our guns and also giving the Japs more hell with another load of rockets.

After escorting the "Bellhops" in, we lay a few hundred yards off shore and peppered targets such as mortar implacements and machine gun nests, which were plenty thick on Suribachi. Clear through to March that was our job around the island fortress. Not all of the mortar fire was directed at the Marines either.

Our little bunch also went right on to Okinawa after a short rest. Ninety-six days were spent there battling the Jap Kamikaze boys. Three of them took dives other than suicide after our guns spoke. All told, our group destroyed almost 50 Jap planes in that campaign.

I could go on for quite some time telling you about our action but this is supposed to be a business letter. In case you would like to know more about the LCS's (called "Mighty Midgets" by Admiral Turner) I can give you some more information on my own and from other sources.

For your information LCS stands for Landing Craft Support. The Navy tagged it LCS (L) (3). The (L) meaning large. The (3) meaning third modification.

I am a Radioman and am writing this letter for the eight men, including myself, in the radio gang. Each of us would very much appreciate a photo.

Science News Letter, September 22, 1945

COMPARISON—The man appears dwarfed beside the huge projectile. The weight of the projectile plus windshield is eight tons; over-all length is 13 feet.

METALLURGY

Iron Ore for 100 Years

Prediction of exhaustion by 1950 is unwarranted as the great Mesabi range in Minnesota may produce on a large scale for over a century.

➤ THE GREAT Mesabi range in Minnesota, barring some now unforeseen development, will be producing iron ore from open-cut operations on a large scale for at least 100 years, predicts Dr. A. B. Parsons in *Mining and Metallurgy*, (Sept.), published by the American Institute of Mining and Metallurgical Engineers. He refers to a report that the known reserves of the Lake Superior district will be exhausted in 1950 if mined at war production rates as misleading.

This report was made in 1942 by E. W. Davis, of the Minnesota Mines Experiment Station, to the War Production Board. These Minnesota mines produced about 85% of the ore that provided the United States with steel for fighting the war. The record shipment from the area was 91,542,000 long tons in 1942; the 1944 shipment was less than 80,000,000 tons, sufficient to meet the needs.

The report by Mr. Davis was based on an annual shipment of 100,000,000 long tons, and dealt only with proved reserves of ore of "merchantable," or direct-shipping grades containing 51.5% iron. Dr. Parsons' study is based largely on figures in the Davis and other reports.

Now that the war is over, Dr. Parsons estimates that average annual shipments will shrink to about 50,000,000 tons a year, because New York State, Alabama and the Far West may in the future contribute more to the total than before the war. The "proved reserves" in Minnesota are much lower than the actual reserves, he feels, because "as soon as it is proved by drilling, first-class ore in Minnesota becomes subject to an ad valorem tax that amounts to about 2 1/3 cents per ton per annum."

This tax, he states, is one good reason for not developing ore too far in advance of the time it is expected to mine it.

As a further source of vast iron ore supplies, Dr. Parsons indicates the possibilities of beneficiating, or treating, ores containing from 35% to 40% iron and from 20% to 40% silica. Since 1930, he says, "about 20% of the ore sent down the Lakes was a product brought up to shipping grade by beneficiating this intermediate material — intermediate between the well-leached direct-shipping ore and the unleached iron-bearing taconite."

These taconites, he declares, particularly those in which the iron oxide is mostly in the form of magnetite, might supply 10,000,000,000 long tons of high-grade concentrates.

Science News Letter, September 22, 1945

MEDICINE

Blood Substitute Used

The Germans used a chemical, Periston, instead of plasma for treatment of shock in their wounded. Is not acceptable by American standards.

➤ THE GERMANS used very little blood plasma for treatment of shock in their war wounded. Apparently they never got around to setting up donor centers such as the American Red Cross organized early in the war.

Instead of plasma, the Germans used a synthetic chemical called Periston. American scientists turned thumbs down on it when they studied it. It is a polymer, polyvinyl pyrrolidone, made in the course of developing new plastics. This and related polymers in some ways physically resemble albumin which is probably what led to development of one of them as a blood substitute.

Periston is one of the war developments of the German chemical industry reported by the industrial intelligence staff of the Chemical Warfare Service. Some of it, however, had been obtained from Germany at least two years ago and studied by scientists on the blood substitutes committee of the National Research Council. Although the Germans are reported to have used over 300,000 units of Periston for military personnel, apparently without harmful effects, the blood substitutes committee was of the opinion that it was probably more harmful than materials American medical scientists would accept for a blood substitute. They also found that it was not sufficiently effective to be recommended for use by American physicians and surgeons.

Penicillin was another aid to American wounded which the Germans apparently did not have. They relied mainly on the sulfa drugs for fighting infection in wounds. One of these, Marfanil, was used so widely that apparently they failed to develop a satisfactory production method for penicillin.

A new sulfa drug, Globucid, developed by Schering, was produced in quantity because of its lower cost compared to sulfadiazine. Two other germ fighters, 3065 and 3214, were still under study when the war ended. These were dibromo and tetrachloro compounds of Salicil.

The Germans produced large quantities of atabrine for malaria and investigated other antimalarial drugs, among them a quinoline derivative called Sontochin. Some showed promise but apparently nothing better than atabrine was developed.

When imports of opium were cut off, lower-yielding domestic poppies were used as a source of this important pain-relieving drug.

Hormones and vitamins, both synthetic and natural, were apparently in large demand and production in Germany, the report states. In a number of instances, technical improvements were made in their method of manufacture. The Germans tried to synthesize vitamin A but failed.

German drug manufacturers gave meticulous care to purification of the final products and to the forms of the end products. They used equipment similar in type to that used elsewhere but carried on their operations on a smaller scale than American drug manufacturers. Kettles, tanks and stills, for example, were usually of only one- or two-quart capacity, except in the cases of drugs produced in large volumes such as the salicylates. Even the sulfa drugs were made in equipment of only moderate size.

Science News Letter, September 22, 1945

Nitroglycerin is now 99 years old; it was in 1846 that an Italian scientist found that combining nitrogen, oxygen and glycerin produces a highly explosive substance.

ORNITHOLOGY

Nests With Awnings

The Allen hummingbird lays its eggs when the nest is a mere platform and they might easily roll out. All the work is done by the female.

See Front Cover

➤THE ALLEN hummingbird, native to California, continues to build its nest until the young birds leave, states Dr. Elmer C. Aldrich of the Museum of Vertebrate Zoology in Berkeley, Calif. Some females lay eggs when the nest is a mere platform and the eggs could easily roll out, Dr. Aldrich reports in *Condor*.

The nest is built, the eggs hatched and the young reared solely by the female. The "unemployed" males may form bachelor societies around choice feeding areas. The female bird on the cover of this SCIENCE NEWS LETTER is shown in normal incubation position.

Awnings in the form of a branch a foot or so above the nest seem to be considered desirable to shade and protect the eggs. Nesting sites usually are chosen because they provide many separate supports for the first materials that are to be laid down. Nests are placed from one to 50 feet above the ground. Dense tangles are favorite sites.

Eucalyptus and cypress trees, oaks and shrubs and vines of streamside thickets provide suitable places for the nests, Dr. Aldrich says. Rather than build on a solid support, the Allen hummingbird tends to build where part of the supporting structure can be incorporated into the sides of the nest.

In eucalyptus trees the nest is built far out on an overhanging branch where the limbs are less than one inch in diameter. Sometimes the nest is saddled between two fruits or on the slender stems of leaves. Occasionally it is placed on a horizontal leaf attached to a vertical stem. Sometimes, instead of choosing one of these swaying locations, the bird places her nest between pieces of loose bark on the main trunk of the tree.

Spiderwebs are essential in building a nest, as they are used to hold the layers as well as the whole nest in place. The webs are gathered from trees, faces of rocks, out of the air, or any place the bird can find them. Webs usually are taken while the hummingbird is on the wing and hovering, reports Dr. Aldrich. They are grasped between the tips of the bill and the fibers are tangled irregularly over all of the bill and sometimes on the forehead and throat. Quick backward movements pull the webs from their moorings.

Down from willow seed is used to line the nest. In gathering the down, the bird makes intermittent stabs and short, backward flights until it has a loose ball about half an inch in diameter in its bill. Feathers, shredded leaves, grass fibers and hair are also used in the nests. Ninety percent of the material is obtained within 25 yards of the nest.

In about nine-tenths of the nests studied by Dr. Aldrich, moss made up the largest part of the outer layer, thus giving the outside of the nest its characteristic greenish color. The nests were invariably decorated on the outside with lichens. Rains tend to keep the mosses and lichens green and fresh.

Practically always two eggs are laid in each nest, being laid on alternate rather than on successive days. The eggs are pure, glossless white. Incubation begins with the laying of the first egg and lasts from 17 to 22 days. The bird sets with her back toward the source of light.

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ELECTRONICS

Better Fluorescent Lamps From New Technique

➤BETTER and brighter fluorescent lamps will come from a relatively new electronic method of applying to the inner walls of their tubes the essential phosphor coatings that transform the invisible ultraviolet rays emitted inside the tubes into visible light. The new process also simplifies and speeds production, improves the color of the light, and increases the emission efficiency by about 4%.

The new technique was developed by Daniel S. Gustin in the lamp division of Westinghouse Electric Corporation. In reality, it is an electrostatic precipitation onto the inside wall of a tube of the tiny particles of the phosphor from a phosphor "smoke" put in the tube. The method is controllable, produces a uniform coating neither too thin nor too thick. Drying or high-temperature baking is not required, and the coating, when once applied, sticks.

INSECURE—The nest is precariously attached to curled tips of bracken fern. A heavy rain caused the nest to stretch. Later both young fell out.

To form the "smoke," Mr. Gustin ground the phosphor finer than talcum powder, inserted the pulverized material in a proper container and passed a jet of air through it. A little of this dusty air is put into the tube to be coated. Then a rounded, pencil-thick rod with a sharpened tip is pulled through the tube. This rod serves as an electrode, introducing into the tube the high voltage necessary to pluck the phosphor particles out of the smoke and precipitate them on the wall of the tube.

When the rod is drawn along the tube interior, the powder particles rushing into its sharpened point become electrically charged with a positive charge. Immediately they are pulled away by electric attraction of the negatively-charged, electrically-conducting heated wall of the tube. The force of the impact causes the particles to adhere to the glass. There they take on an insulating property leaving only clear glass to attract more powder. This gives the even distribution.

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The fixation in soils of *nitrogen* from the air depends upon the presence of liberal amounts of organic residues in the earth as a source of bacterial energy.

CHEMISTRY

Fine Hard Wallboard Made from Sawdust

➤ HOW SAWDUST and other wood waste can be made into a fine quality hard wallboard by a new chemical process and a hydraulic press was demonstrated recently to a group of scientists at the Polytechnic Institute in Brooklyn, where the new method was developed. The simple chemicals used are themselves waste by-product of wood-using industries.

The new process is so simple and the equipment costs so low, that every sawmill in the country producing a few tons of sawdust a day will find it a profitable project. The sawdust passes directly from the saw to a mixer where the chemical is added. A minute or two is all that is required for the mixing. Then the pulp is squeezed in a hydraulic press. The catalytic action of these wood-derived chemicals causes the wood to recombine with itself into a strong, grainless board.

By use of molds, the pulp can be pressed like a plastic into any special shape required, such as into complete doors, panels or molding. It has been compressed into cups, plates, trays, and probably can be shaped into one-piece dories and duck boats.

With the new process, it is claimed, 2,000 square feet of first quality, strong, water-resistant wallboard can be obtained from one ton of sawdust. It is estimated that 20,000,000 tons of sawdust and related fine shavings and chips result from all phases of production by the lumber-using industries of America each year. In addition to annual sawdust production, vast quantities of old sawdust may be found in lumber areas. With the partial depletion of timber supplies due to excessive war needs, wallboards made from waste sawdust might prove particularly desirable during the expected building boom of the next few years.

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GENERAL SCIENCE

Science Research Center Under Construction

➤ A NEW industrial science research center under construction in Bound Brook, N. J., is another bit of evidence of appreciation by American industrialists of the part science played in winning the war, and the increasingly important part scientists will play in American manufacturing. The building under construction is the first unit of a gigantic center to carry on research work in the field of building materials. It is being erected by the Johns-Manville Corporation.

A unique feature of the first building of the group planned, a $2,000,000 structure, is that it will contain central laboratories and 10 experimental factories. Projects initiated in the laboratories may thus be carried through their development and pilot-plant production stages under one roof. This is expected to speed up the development of new and improved materials for building and for industrial uses.

The completed research center, if constructed according to present plans, will include six buildings on a 93-acre plot, across the Raritan river from the company's plant at Manville. They include two laboratory-factory structures, a research engineering and machine shop building, a water filtration and waste processing building, and utility buildings.

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ELECTRONICS

Hydrogen in Furnace Continuosty Indicated

➤ THE HYDROGEN content in copper wire annealing furnaces, an element whose presence is detrimental to the process, is now continuously indicated by a new sensitive apparatus called a sniffer nose. It also detects the presence of other detrimental gases, such as oxygen and carbon monoxide, because they are usually present in quantities proportionate to the hydrogen content.

The new apparatus is a development of General Electric laboratories. It is extremely simple in design and operation, and can be used with any of the ordinary annealing furnaces now in use in wire manufacturing plants. By means of it an accurate and precise indication of annealing furnace conditions can be maintained, it is claimed, and information is provided which formerly could be obtained only by lengthy chemical analysis.

Bright annealing of copper for wire applications must take place under extremely well-regulated furnace conditions, in what engineers called a neutral or reducing atmosphere. It must contain very little hydrogen, since this gas tends to make the wire brittle. The presence of oxygen causes oxidation and the formation of the green material that can often be seen on copper roofs. The presence of carbon monoxide causes the loss of certain valuable properties of the wire.

Science News Letter, September 22, 1945

IN SCIENCE

ASTRONOMY

Autumn Officially Begins on Sept. 23

➤ AUTUMN officially begins this year on Sunday, Sept. 23, at 5:50 a.m., E. W. T., when the sun's center will be directly over the equator of the earth, according to calculations made at the Nautical Almanac Office of the U. S. Naval Observatory in Washington, D. C.

At this time of the year the sun rises directly east and sets directly west. Hence, supposedly it is above the horizon for half of the 24 hours and below for the other half, making the days and nights exactly equal in length. The name "equinox," in fact, means "equal night." This is not quite true, however, as the sun's light is bent as it comes through the atmosphere, and we can actually see the sun while it is slightly below the horizon.

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MEDICINE

Cashew Nut Shell Oil Found Poisonous to Some

➤ PERSONS who are sensitive to poison ipy become industrial risks when they work with the oily liquid extracted from cashew nut shells, which is now used in the preparation of certain resins and plastics employed in brake linings and insulating materials. A study of the ill effects of this liquid is reported in *Science* (Sept. 14), by Dr. Harry Keil, of the New York Post-Graduate Medical School and Hospital, and Dr. David Wasserman and Dr. Charles R. Dawson of Columbia University.

The cashew nut tree and poison ivy are fairly close botanical relatives, though their native habitats are half a world apart. The active principles that make them a menace to sensitive skins are chemically related; both belong to the phenolic group of compounds.

The three investigators also call attention to the fact that men in our armed forces who are sensitive to poison ivy have reacted to the foliage of the cashew nut tree when they came into contact with it in the Southwest Pacific region. Sometimes the effects were disablingly severe, as they occasionally are with poison ivy.

Science News Letter, September 22, 1945

CE FIELDS

CHEMISTRY

Many New Types Of Synthetic Rubber

➤ NOW THAT the war is over, and with it the necessity for "freezing" onto one formula for maximum production of synthetic rubber, it can be expected that rubber chemists will strike out along new lines in efforts to produce synthetics that will equal or better the performance of natural rubber—which the war-time GR-S rubber quite definitely did not, lifesaver though it was in time of need.

In keeping with this expectation, two research chemists of the B. F. Goodrich Company at Akron, Dr. Waldo L. Semon and Dr. Charles F. Fryling, have received a number of U. S. patents on new synthetic rubbers. Although many possible compounds are listed, they all call for butadiene or one of its close chemical relatives as a principal ingredient. Instead of the styrene which forms the other half of the present standard GR-S rubber, these new synthetics call for acrylonitrile and one other ingredient, which may be selected from a considerable list, but usually belongs to the group known as the alkyl acrylates.

Among the advantages claimed for the new synthetics are high plasticity and easy workability in the unvulcanized state, with great strength and elasticity after vulcanization. They are said to be especially good at low temperatures, such as are encountered by aircraft at high altitudes.

Each of the two chemists received five patents; Dr. Semon's are numbered 2,384,568 to 2,384,572, and Dr. Fryling's from 2,384,543 to 2,384,547. Rights in all are assigned to the B. F. Goodrich Company.

Science News Letter, September 22, 1945

GENERAL SCIENCE

National Research Council Offers Fellowships

➤ YOUNG SCIENTISTS who have had their graduate work interrupted by war duty and are now ready to resume their studies are invited by the National Research Council to apply for grants from a special $335,000 fellowship fund provided by the Rockefeller Foundation. Unlike fellowships previously administered by the Council, which were given only to persons who had already obtained the Ph.D. degree, these new fellowships are for men and women who have their bachelor's degree but have not yet completed the additional three or four years of work required for the doctorate.

These predoctoral fellowships are intended specifically to help in "the recovery of the scientific vigor and competence of the country which is so seriously threatened by the loss of almost two graduate school generations of scientifically trained men and women."

The annual stipend will be $1200 for single persons and $1800 for married men. In general it is expected that each recipient will spend at least eleven months per year on academic work. An additional allowance up to $500 per year will be made for tuition fees. Fellowships granted to individuals who are eligible for educational support from the "G.I Bill of Rights" will be at such stipends as to bring the total income from these two sources to that which would be received at the above rates. Prospective applicants are urged to write to the National Research Council at once, even though they may not be able to undertake their graduate work until later.

Information about the NRC predoctoral fellowships, together with applications blanks, are being mailed to graduate schools throughout the country, as well as to wartime reasearch laboratories. Prospective graduate students may obtain information from these places, or by writing directly to the Secretary, Committee on Predoctoral Fellowships, National Research Council, Washington 25, D. C.

Science News Letter, September 22, 1945

METALLURGY

Method for Recovery Of Indium from Zinc

➤ INDIUM, a scarce metal related to aluminum, used in small quantities as an alloy in dental work and as a plating material, is recovered from zinc, in which it occurs as an impurity, by a chemical method on which patent 2,384,610 was granted to H. M. Doran, M. A. Jackson and A. I. Alf, all of Great Falls, Mont. Essential steps are solution in sulfuric acid, with subsequent electrolytic recovery of the zinc, and precipitation of the indium in the form of a bisulfite. The latter salt is further treated to free it from iron, aluminum and other impurities, then redissolved in an acid and subjected to electrolysis to get out the pure metallic indium.

Science News Letter, September 22, 1945

PHYSICS—GEOGRAPHY

Site of Atomic Bomb Test To Be National Monument

➤ THE ATOMIC bomb explosion site in New Mexico and surrounding area is to be recommended as a national monument, the Secretary of the Interior has decreed. In a way, the monument will be dedicated to science and to the scientists of America, Great Britain and other countries who pooled their knowledge and skills in producing the development that delivered the final stroke that hastened the Japanese surrender.

The site of the first non-laboratory test of an atomic bomb, where its destructive potency was proved, is on what is known as Alamogorda, N. M., bombing range. It is within a federal grazing district and was withdrawn for the use of the Army in 1942.

The Interior Department's recommendation that this area be made a national park must go to the President for consideration and action. Already the Commissioner of the General Land Office has received instructions to reserve the land for creation of the monument, and the National Park Service, under whose administration national monuments rest, has been ordered to make the necessary surveys as soon as the Army permits.

Science News Letter, September 22, 1945

CHEMISTRY

Addition of Formaldehyde Improves Gramicidin

➤ GRAMICIDIN, one of the first of the germ-stopping antibiotics to be discovered, has never come into use for disease treatment because it is poisonous to animal tissues, and also destructive to red blood corpuscles. Addition of formaldehyde to gramicidin solutions renders it less harmful in these respects, while its ability to check the growth of bacteria remains unchanged, Dr. J. C. Lewis and a group of five colleagues report in *Science*, (*Sept.* 14).

Dr. Lewis and his research team carried on their work at the Western Regional Research Laboratory of the U. S. Department of Agriculture at Albany, Calif. They are continuing their investigations, and promise a fuller report at a future date.

Unlike penicillin, which is derived from a mold, gramicidin is produced by a soil-dwelling bacterium. It attacks germs belonging to a group against which penicillin is ineffective.

Science News Letter, September 22, 1945

GENERAL SCIENCE

Scientists of the Future

With the war over, youth is anxious to get on with its work of building a greater America and a more livable world through science.

By MARGARET PATTERSON and FRANK THONE

➤ THE DEFEAT of Japan is attributed by Hirohito to the greater scientific achievements and resources of his enemies.

Exactly what the Mikado may have been thinking when he made this statement is of course his own secret, but it is fairly safe to conjecture that the poor little man's ears were still ringing from the atom-bomb thunderclaps in which two of his cities had instantly vanished, with the paralyzing fear that many others could be blasted in like manner at any moment.

He may also have had echoing about in his head other key-words of modern applied science, representing things that have contributed directly or indirectly toward the overwhelming technical superiority of the United States and other nations arrayed against him—words and symbols like radar, pentolite, high-octane, nylon, sulfa, penicillin, DDT.

All these things came out of the laboratories of the West, and found their way into use in planes, on warships, among the advancing ground troops, in hospitals where his enemies' wounded and sick recovered to return and fight again. It was truly a dismaying array of knowledge and skill to have to face, while his own universities and high schools had to be emptied into the armed forces, and even grade-school children were at last desperately drafted into the island empire's dwindling war industries.

Look at Our Record

Before we Americans accept this reluctant compliment too smugly, we had better take a good look at our own record. True enough, we have in the past few years wrought scientific miracles in war, and expect to go on working them in peace. But what have we paid? Are the brains that made these miracles possible still on the job? Will they be, for the no less exacting demands that peace will bring?

We have been warned lately, and from most responsible sources too, that in our eagerness to swell numbers in the armed forces we have been stripping our own laboratories and universities and even high schools of exactly the type of intellects and skills that has made our hard-won victory possible at all.

The now much-quoted report of Dr. Vannevar Bush, head of the Office of Scientific Research and Development, pointed out that because of the indiscriminate drafting of young scientists to serve in the ranks of infantrymen—and in barracks as KPs—we now have 150,000 fewer college graduates with degrees in the sciences than we normally should have, and a further deficit of 17,000 in the elite corps of research men—those who have piled another three or more years on the four-year college course and are ready to carry on independent investigations and to train others in their advanced fields.

These are dismaying deficits for the most powerful nation in a science-ruled world to face. Because they are so big they have a tendency to dull the mind to their real significance. So let's take a look at a smaller sample—one where individuals may be seen and counted.

During the past four years, the Annual Science Talent Search has been conducted by Science Clubs of America, among high school seniors all over the country, to select 40 exceptional boys and girls who will be brought to Washington, D. C., as finalists in competition for honors and substantial Westinghouse Science Scholarships. The fifth of these searches is now in progress and will end Dec. 27.

Of the total of 160 students who have thus far reached the finals in the four annual searches, 43 are girls. Since they are not subject to the draft and most of them are too young to be accepted for uniformed service women's organizations, they have gone on with their college courses.

Of the 117 boys, 59 have been called

SECRET PROJECT—Irving W. Rozian of the University of Michigan is shown working on the audio-oscillator which he assisted in building for a war-secret project for NDRC of OSRD.

CANCER STUDY—Virginia March, working at McArdle Memorial Laboratory for Cancer Research, University of Wisconsin, is shown giving a mouse its semi-weekly painting with hydrocarbons to induce tumors to aid in the study of cancer.

to the colors and thus have had their scientific training interrupted more or less seriously. Some of the other boys were under military age or were deferred for one reason or another.

Of the 59 called up for service, 33 were permitted to continue their medical, dental and engineering courses under Army and Navy training programs. Some of the others were sent to serve with the infantry and other Army and Navy combat outfits, where their scientific background was of little or no use. Others were rushed through short training courses and assigned to duty as specialists in communications, laboratory technicians and so on. Two were later invalided home. One of these, wounded in some of the toughest infantry fighting in Germany, received his discharge just before V-J Day and is now ready to resume his study of chemistry where he had to drop it a couple of years ago. Up to now, fortunately, none of the 59 young men in the fighting services has been reported killed.

However, some of them have been able to work along lines in which their special talents have been partially utilized in the war effort; and in a few instances their war experience has even opened up new outlooks or given new opportunities.

For instance, Cpl. Allan E. Voigt of Salem, Ore., set to work in an Army hospital, developed certain laboratory techniques useful in the study of malaria. He was also permitted to make a malaria survey of Germans in a prisoner-of-war camp. Lately he has switched his attention to the effect of penicillin on bacteria in myelitis cases. He is pointed straight for medical school at Northwestern University as soon as he gets his discharge.

Cpl. Barton Brown of Sea Cliff, N. Y., after a year of chemistry at Massachusetts Institute of Technology, was put to work on some hush-hush communications equipment at Mitchell Field. As a result of this experience he intends to return to that school with electronics as his major.

German Interpreter

Pfc. Robert L. Folger of Winter Haven, Fla., is getting a fine edge on his knowledge of German, which will continue to be an important language to scientists because of the immense amount of important research results published in Germany before the Nazis brought ruin to that country. He has been teaching a class of his fellow GI's, and is also chief interpreter for his battalion. But he is anxious to get back to his chemistry laboratory at the University of Illinois.

Students who were permitted to pursue their college courses undisturbed by calls to the armed service have not been out of the war picture altogether. Some of them, indeed, have been very much in it. Just a few examples:

John W. Michener of Pittsburgh, studying physics at the Carnegie Institute of Technology, has found time also to work on several secret OSRD projects in communications.

Richard Hinkle of San Francisco, student at the University of California, has served as a human guinea pig in high-altitude tests in the pressure chambers of the Donner Research Laboratory.

Rodman Jenkins, pointing for a career in chemical engineering at the Massachusetts Institute of Technology, has helped to make a new synthetic anti-malarial drug similar to atabrine. Along with many other Science Talent Search winners there, he is a member of the M. I. T. Rocket Society.

The girl winners in the various contests haven't been living in ivory towers while the world was at war, either. First girl to take first honors, Marina Prajmovsky of Farmingdale, N. Y., has now received her bachelor's degree *magna cum laude*, with a Phi Beta Kappa to boot. She is taking a year out before she starts toward her Ph.D., to put in full-time work on a regular laboratory job at Harvard, investigating the physiological effects of DDT on nerves.

Evelyn Pease of Evansville, Ind., chemistry student at the University of Indiana, has spent her summer vacations working in a laboratory in her home town, helping in the synthesis of new

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There are 2100 species in the *carrot* family.

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Citrus juices are America's favorite fruit drink, and account for about 80% of the canned fruit juices consumed.

India has large supplies of iron ore, manganese ore and coal, so is in a position to become a heavy producer of steel.

A new process in *magnesium casting,* in which stirring replaces superheating, has been developed in University of California laboratories.

An *underwater spotlight* for deep-sea diving operations packs 1,000 watts inside a bulb the size of an ordinary 40-watt type; if lighted where there is no cooling water pressure, it would fail in a few minutes.

sulfa drugs. For relaxation she takes flying lessons.

Two girls have taken over tasks set aside by male members of the Harvard College Observatory when they went into war work. The girl astronomers are Anne Hagopian, first-place winner in 1944, who is a student at Radcliffe, and Constance Sawyer, who commutes from Smith College for her nocturnal job in Cambridge. Photographic plates taken by these girls through the big Harvard telescope show the outburst of the latest nova, or exploding star, found in the constellation Aquila.

Patricia Dunkel of Rochester, N. Y., Wellesley student, got her summer suntan the hard way. She gained practical experience by taking an outdoor job on the farms of a seed company, where she did everything from transferring pollen to swinging a hoe.

Wartime college life has been real and earnest for these ambitious young scientists, but it hasn't been without its share of regular student fun. Nor have they been pale young intellectuals, either: football, basketball, wrestling, pulling an oar on the varsity and other strenuous forms of sport have split time with swimming, tennis and sailing. Two things that might set them slightly apart from the pre-war "College Joe" are a rather general interest in chess and a decided liking for the more serious type of music. A number of the young men and women are themselves musicians; the violin seems to be the most favored instrument.

Now that the war is over they are champing at the bit to get on with their real occupation, which is preparation for doing their part towards the building of a greater America and a more livable world through science. They take a decided interest, too, in plans for the first peacetime Science Talent Search, which will culminate in the early spring of 1946.

They are urging their younger schoolmates, now seniors in high school, to get into the contest. Science Service, in Washington, D. C., which administers the annual Science Talent Search, is already beginning to receive inquiries from interested teachers and school officials.

Science News Letter, September 22, 1945

CHEMISTRY

Chemical Industry Medal Awarded to Editor

➤ THE CHEMICAL Industry Medal for 1945 has been awarded to Sidney D. Kirkpatrick, editor of *Chemical and Metallurgical Engineering,* a McGraw-Hill publication, by the American Section of the Society of Chemical Industry. It is an annual award, made for contributions to the advancement of chemical engineering and research.

The presentation of the medal will be made in November. Selection of recipients is made each year by the society's executive committee.

Science News Letter, September 22, 1945

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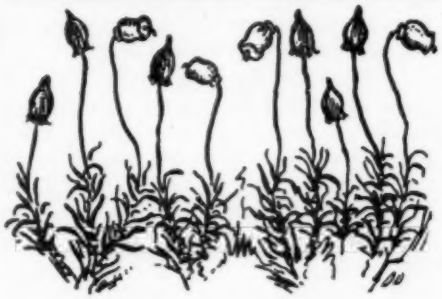
BOTANY

NATURE RAMBLINGS

by Frank Thone



Useful Plants

➤ MOSSES, as a group, have almost no practical uses. This not very encouraging statement, in the introduction to a new book, *How to Know the Mosses,* might seem almost an invitation not to buy or read it. And that would be a pity indeed, for mosses have greater immediate interest, and greater ultimate usefulness, too, than such a deprecatory declaration admits on its face.

Mosses do have at least a few practical uses, the author, Dr. H. S. Conard, emeritus professor of botany at Grinnell College, concedes. Sphagnum is widely used as a moist packing material for live plants and small nursery stock in shipment, and on an even larger scale as a conditioner of heavy, humus-lacking soils. It is also used to some extent as an absorbent material in special-type surgical dressings. Some of the giant West Coast mosses serve as replacements for excelsior or shredded paper in packing crockery.

But the higher usefulness of mosses is what they accomplish just by being alive and having their places in the complex of the earth's vegetation. They aid materially in making this planet a fit place for men and beasts and bigger plants to live on. They and their kin-plants, the liverworts, colonize bare rock after it has been pioneered by the tougher and even lowlier plants, the lichens. They cover gashed scars in soil left by landslips, by erosion, by forest fires, and hold it until larger plants are ready to take over. They mantle the trunks of fallen trees in wet woods, and at least indirectly aid in their return to humus for the enrichment of the soil.

Not the least of the usefulness of mosses is the stimulus they give to the intellectual curiosity of human beings, and the esthetic satisfaction they yield upon more intimate acquaintance. If you can get yourself past the point where "all mosses look alike", you will find an infinite variety in form, and many most interesting mechanical adaptations to meet the problems of living.

Bringing out these points, and also giving some ideas of the beauties to be found in mosses, has been the task of the book's illustrator, Miss Louisa Sargent. Her 363 small, accurately made pen drawings are enough in themselves to convince the curious nibbler at the pages of what fascinating vistas in miniature he will open up if he will equip himself with a reasonably good hand lens and start peering at the stiff little evergreen leaves and the gnome-like, flowerless fruiting growths that he has until now never troubled to look at.

Science News Letter, September 22, 1945

BODYSCOPE

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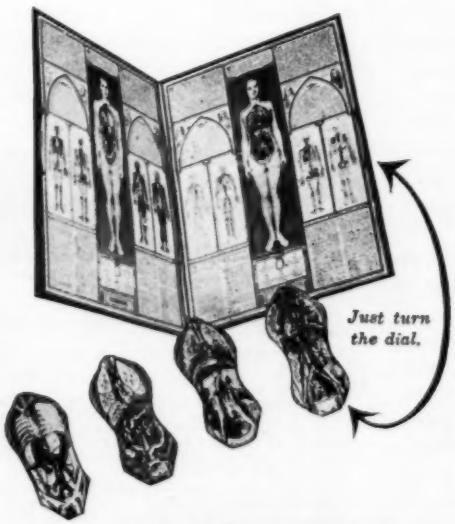

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PHYSICS

Youth's Responsibility

Taming of atomic power belongs to the young boys and girls, just as a generation ago they showed others the technicalities of radio.

➤ *THE TASK of taming atomic power belongs to youth. Just as, a generation ago, graybeards were turning to the high school boys of that day to learn the technicalities of radio, today the world must find among the coming generation the lads who understand the mysterious workings of atomic energies.*

Many of the boys and girls writing essays as part of their requirements for the Science Talent Search showed great eagerness to undertake atomic research. There is no reason to think that thirst for the subject was other than increased by the shield of silence imposed the last few years for public security.

The power that can be developed from the atom was a favorite essay topic for the first three years' contestants. Those who wrote on atomic power are now studying physics in college. A comprehensive resume of past research and predictions of future use is given in the following excerpts from essays by these winners:

➤ ALUMINUM was the first artificially radioactive element. A high-speed stream of alpha particles was directed at a target of this metal which, after the bombardment stopped, continued to emit neutrons and positrons. . . . William Hammerle, Athens, Ohio.

The nucleus of any atom is an apparent contradiction to electrical laws, for the protons, although of the same electrical charge, are tightly held together by some force that we do not yet understand. It has been known for some time that if we could destroy this bond, tremendous amounts of energy would be released. . . . Clifford Schwartz, Niagara Falls, N. Y.

Since the nucleus characterizes the entire element, its weight and the number of electrons involved in chemical reactions, as well as the radioactive properties of the element, most atomic research now concerns the nucleus. . . . Anne Hagopian, New York.

To convert an atom into energy, the strong electric bonds which tie the nucleus to the electrons must be broken. This may be done by using a high-speed particle to "shoot out" the nucleus. If the nucleus is only split, or captures the bombarding particle, an entirely different atom is the result. If the nucleus of the new atom is not stable, it will disintegrate, liberating energy. . . . Murray Gerstenhaber, Bronx, N. Y.

The nucleus splits into a few parts, the energy of the reaction being given off partly as gamma rays but mostly in the form of kinetic energy of the moving fragments—in other words, heat, since heat is molecular motion. Among the products are a few fast neutrons. If these neutrons are slowed up and returned to the uranium mass, the same process will repeat itself. . . . Victor Mayper, Jr., Manlius, N. Y.

Once nuclear fission has occurred, a reaction which lasts 10-12 seconds, the two resulting particles which are themselves unstable disintegrate with the emission of neutrons. So it happens that a single neutron which possesses an energy of the order of five electron volts causes a fragmentation which produces fully 100,000,000 to 200,000,000 times more energy and at the same time leads to the production of more neutrons. These resulting neutrons, if slowed down, further the fission process and make it a self-propagating or chain reaction. . . . Murray Rosenblatt, New York.

In breaking up, the atoms take on great speed which is soon transformed to heat. It would require nearly 200,000,000 volts to duplicate this. Or, in comparison, coal is nearly 50,000,000 times feebler than U-235 in reaction. . . . Hillman Dickinson, Independence, Mo.

It is the opinion of many that this will be a long war. U-235 is a weapon which could end it quickly, but it must be our weapon, and we know that Nazi scientists are working on it too. . . . Beatrice Meirowitz, New York.

The study of atomic structure opens many opportunities for research to the chemist. Very interesting experiments with isotopes ought to be possible, particularly in the field of organic chemistry where isotopic carbon and hydrogen compounds and combinations of isotopic and normal forms may be prepared and analyzed. . . . Joan Kunkel, Garden City, N. Y.

Science News Letter, September 22, 1945

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• Books of the Week •

➤ THE WAR, a harsh schoolmaster, taught us thoroughly how much dependent we are on the southeastern corner of Asia for many necessities and comforts. We get these things only because men and women there work to produce them: the brown-skinned peoples we sweepingly lump as "Malayas". The highly varied patterns under this seemingly uniform brown surface have been a lifelong study of Prof. Fay-Cooper Cole of the University of Chicago; in his new book, THE PEOPLES OF MALAYSIA, he tells about them in easy, informal yet accurate fashion. (*Van Nostrand*, $4).

Science News Letter, September 22, 1945

➤ CLIMATOLOGY, especially in its comparative phases, has all of a sudden become a highly "practical" matter, its applications ranging all the way from choice of crop plants and livestock for the rehabilitation of war-wrecked countries to the siting and planning of new world-line airports. Valuable to the serious worker in this field is Wladyslaw Gorczynski's COMPARISON OF CLIMATE OF THE UNITED STATES AND EUROPE (*Polish Institute*, $5).

Science News Letter, September 22, 1945

➤ CHANGE, at a rate that will undoubtedly bewilder thousands of primitive minds, impends in many lands where change was hardly even a word in the native vocabulary before the war. What may happen and how it may come about, is outlined in THE DYNAMICS OF CULTURE CHANGE, written by the late Bronislaw Malinowski not long before his death in 1943. This should be a useful book for young men preparing for administrative tasks in far places and among strange folk. (*Yale Univ. Press*, $2.50).

Science News Letter, September 22, 1945

➤ ONE MAN'S struggle with the problem of soil wastage and its consequences in human deterioration, in Oklahoma, in the Philippines, in California, is vividly and earnestly told by Joseph A. Cocannouer in TRAMPLING OUT THE VINTAGE (*Univ. of Oklahoma Press*, $2.75). Hopeful portent for the nascent Philippine Commonwealth is the fact that his ideas were more hospitably received there than in Oklahoma.

Science News Letter, September 22, 1945

• Just Off the Press •

ADVANCES IN NUCLEAR AND THEORETICAL ORGANIC CHEMISTRY—R. E. Burk and Oliver Grummitt, eds.—*Interscience*, 165 p., illus., $3.50. Vol. III of FRONTIERS IN CHEMISTRY. A collection of lectures delivered at Western Reserve University.

THE CHEMICAL CONSTITUENTS OF PETROLEUM—A. N. Sachanen—*Reinhold*, 451 p., illus., $8.50.

THE GERMAN TALKS BACK—Heinrich Hauser—*Holt*, 215 p., $2.50. Introduction and footnotes by Hans J. Morgenthau.

HANDBOOK OF NONFERROUS METALLURGY: *Principles and Processes*—Donald M. Liddell, ed.—*McGraw*, 656 p., illus., $6.50. 2nd ed., revised.

HIGH-PRESSURE DIE CASTING: A Design Guide for Engineers—H. L. Harvill and Paul R. Jordan—*Harvill Manf. Co.*, 130 p., illus., $5.

HOW TO PRESERVE FOOD—Walter W. CHENOWETH—*Houghton*, 287 p., illus., $2.50. A scientific and practical textbook covering the whole field of home food preservation.

MACHINE TOOL GUIDE: Engineering Data Covering the Principal Machine Tools—Tom C. Plumridge and others—*Am. Tech. Soc.*, 773 p., illus., $7.50. Especially prepared for tool engineers, millwrights, and tool equipment salesmen.

MACHINERY OF STAINLESS STEELS—*Rustless Iron and Steel Corp.*, 83 p., paper, illus., free. Rustless library of stainless steel information No. 2.

OUR INNER CONFLICTS: A Constructive Theory of Neurosis—Karen Horney—*Norton*, 250 p., $3.

TEXT-BOOK ON SPHERICAL ASTRONOMY—W. M. Smart—*Macmillan*, 430 p., illus., $4.75. 4th ed., revised and enlarged.

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Hybrid corn occupies two-thirds of the total corn acreage in the United States this year.

In the Maintenance of the Hemoglobin Level

In the continuous process of destruction and regeneration of erythrocytes by which the oxygen-carrying capacity of the blood is maintained, the extent of hemoglobin synthesis depends largely on the protein supplied to the organism.

Protein is an essential "raw material" for the formation of the hemoglobin molecule. Unless the protein made available to the organism is adequate in quantity and quality, anemia supervenes.

The only source of the protein required for maintenance of the hemoglobin level is the protein derived from the foods eaten.

Among the protein foods of man meat ranks high—not only because of the percentage of protein contained, but principally because the protein of meat is of high biologic quality—able to satisfy every protein need.

ACCEPTED AMERICAN MEDICAL ASSN. Council on Foods and Nutrition

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

AMERICAN MEAT INSTITUTE

MAIN OFFICE, CHICAGO . . . MEMBERS THROUGHOUT THE UNITED STATES

•New Machines and Gadgets•

❁ *HYPODERMIC syringe, which does not require the use of a hollow needle, discharges the liquid to be injected under high pressure (approximately 400 pounds per square inch) through an orifice so minute that it is vaporized finely enough to pass through the skin without visible punctures.*

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❁ *INFANT COTS, particularly for maternity hospitals, are supported on legs equipped with casters, and have side clamps by which they may be easily attached together. Either one or several together may be rolled by one person to the bedsides of the mothers.*

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❁ *ANTI-RATTLER for windows, inserted only where needed, is a flat double piece of hard brass with a wedge-shaped end to push between sash and frame. The front piece of the two double pieces curves outward for convenience in handling, then inward so that its springy free end presses the sash.*

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❁ *SEAT attachment which may be applied to any ordinary crutch, has a clamp to hold it on the staff at the proper place. When opened, the seat, legs pivotally attached to the clamp, and crutch form a three-legged chair.*

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❁ *BOW-TIE vane on the tip of a bomb nose fuze controls the arming time which must elapse before the falling bomb can explode. In falling the vane, seen in the picture, revolves a predetermined number of times before it flies off releasing*

safety blocks, and leaving the fuze armed ready for firing.

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❁ *MINIATURE voltmeters, ammeters, milliammeters and microammeters, one inch in diameter and weighing 1¼ ounces, are hermetically sealed in rugged aluminum cases, and have high accuracy. They are usable in aircraft and portable equipment fields.*

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❁ *SHARPENING instrument, which resembles the ordinary "steel" for carving knives, has an elongated center section of metal with four deep longitudinal grooves that hold different abrasives of varying coarseness. It is particularly suitable for sharpening hollow-ground carving knives.*

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❁ *WOOD SCREW, having a straight cylindrical shank of uniform diameter and sharp-faced knife-like threads of greater height than base on the shank, has maximum holding qualities when screwed crosswise or lengthwise of the grain of the wood. The threads have a steep pitch.*

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 277.

BOOKS

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